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The Plant Disease Reporter is issued as a service to plant pathologists throughout the United States. It contains reports, summaries, observations, and comments submitted voluntarily by qualified observers. These reports often are in the form of suggestions, queries, and opinions, frequently purely tentative, offered for consideration or discussion rather than as matters of established fact. In accepting and publishing this material the Division of Mycology and Disease Survey serves merely as an informational clearing house. It does not assume responsibility for the subject matter.

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CHECK LIST REVISION

Freeman Weiss

ARRHENATHERUM (GRAMINEAE)

ARRHENATHERUM ELATIUS (L.) Mert. & Koch, TALL OATGRASS; including var. BULBOSUM (Willd.) Spenner, TUBER OATGRASS. Meadow grass of Europe, long cult. for forage and hay in the Eastern U. S. and widely naturalized.

Ascochyta graminicola Sacc., purple leaf speckle. Oreg.
Cladosporium graminis Cda., mold. Wash.
Claviceps purpurea (Fr.) Tul., ergot. Mo., Mont., Ohio, Oreg.
Colletotrichum graminicolum (Ces.) G. W. Wils., anthracnose. Minn., Ohio, Va.
Helminthosporium avenae Eidam, leaf spot. Calif.
Heterodera marioni (Cornu) Goodey, root knot. S. Car.
Macrophomina phaseoli (Maubl.) Ashby, charcoal rot. N. Dak.
Ovularia pulchella (Ces.) Sacc., leaf spot. Oreg.
Pseudomonas coronafaciens (Elliott) Stapp, halo blight. Calif.
Puccinia coronata Cda. (II, III), crown rust. La., Minn.
P. graminis Pers. (II, III), stem rust. Ind., La., Minn., N. Y., Oreg., Wash., W. Va. Var. avenae Eriks. & Henn.
Pythium arrhenomanes Drechsl., root browning. N. Dak.
P. debaryanum Hesse, root necrosis. N. Dak.
Sclerotium rolfsii Sacc., Southern blight. La.
Scolecotrichum graminis Fckl., brown stripe. Md., Miss., Mont., N. Y., Oreg., Pa., Wash.
Selenophoma donacis (Pass.) Sprague & A. G. Johns. var., stem speckle. Mont.
Septogloeum oxysporum Sacc., Bomm. & Rous., char spot. Oreg.
Stagonospora arenaria Sacc., leaf blotch. Pa.
Ustilago avenae (Pers.) Jens., loose smut. Iowa, Pacific Northwest.
U. perennans Rostr., head smut. Widespread.

ARUNDINARIA (GRAMINEAE)

ARUNDINARIA GIGANTEA (Walt.) Chapm., SOUTHERN or GIANT CANE, and A. TECTA (Walt.) Muhl., SMALL CANE. Tall reeds forming large colonies in river lowlands of the Southeastern and Gulf States; used for baskets, mats, and poles; they also furnish forage and the sprouts are used as edible herbs.

Apiospora montagnei Sacc., on culms. Gulf States.
Aulographum arundinariae Cke., on culms. Ga.
Cercospora scolecotrichoides Atk., leaf spot. Ala.
Colletotrichum graminicolum (Ces.) G. W. Wils., anthracnose. Miss., S. Car.

ARUNDINARIA GIGANTEA cont.

Coniosporium spp., on (usually) dead culms & leaves. General. C. shiraianum (Syd.) Bub. is reported as causing a leaf spot in Tex.; C. sphaerospermum Pers. ex Mason (C. arundinis (Cda.) Sacc.) and C. gramineum (Ell. & Ev.) Sacc. occur commonly on dead culms throughout the Gulf States.
Dothidella minima Sacc. & Syd., leaf spot. La.
Echinodothis tuberiformis (Berk. & Rav.) Atk., on culms. Ala.
Hendersonia arundinariae Fairm., on culms. N. Y.
Leptosphaeria culmicola (Fr.) Karst., on dead culms. Ga.
Leptothyrium cylindricum Atk., leaf spot. Ala.
Lophodermium arundinaceum (Schrad. ex Fr.) Chev., tar spot. Ala., Ga., S. Car.
Meliola tenuis Berk. & Curt., black mildew. Ala., Ga., Miss.
Mycosphaerella arundinariae (Atk.) Earle, on leaves. Ala.
Ophiobolus stictisporus (Cke. & Ell.) Sacc., on culms. Ga.
Phyllachora sp., on culms. Ga., Ill., Miss., S. Car.
Puccinia arundinariae Schw. (II, III), leaf rust. N. Car. to Ala., Texas and Okla. C & I unknown, possibly on Smilax.
Sclerotium sacidioides Speg., on leaves. Va.
Scolecotrichum graminis Fckl., brown stripe. Ala.
Stigmatea sclerotidea Cke., on leaves. Ga.

ARUNDO (GRAMINEAE)

ARUNDO DONAX L., GIANT REED. Tall reed indigenous to tropical regions of Old World, cult. in America for ornament and material for baskets and mats; naturalized in Gulf States to Calif.

Coniosporium sphaerospermum Pers. ex Mason, on leaves. Calif.
Leptostroma donacis Schw., on stems. N. Car.
Lophodermium arundinaceum (Schrad. ex Fr.) Chev., on culms. S.Car.
Puccinia coronata Cda. (II, III), crown rust. Calif.
Selenophoma donacis (Pass.) Sprague & A. G. Johns., stem spot. Calif.
Stictis helicotricha Ell. & Ev., on leaves. Miss.

AVENA (GRAMINEAE)

AVENA BARBATA Brot., SLENDER OAT. Introduced from Europe and established as a weed in the Pacific Coast States, sometimes used for hay; enters into parentage of some cult. vars.

Helminthosporium avenae Eidam, leaf spot. Calif.
Heterodera marioni (Cornu) Goodey, root knot. Calif.
Puccinia coronata Cda. (II, III), crown rust. Calif., Kans., Nebr.

AVENA BARBATA cont.
Puccinia graminis Pers. (II, III), stem rust. Calif., Oreg.
Var. avenae Eriks. & Henn.
P. rubigo-vera (DC.) Wint. (II, III), leaf rust. Calif.
Var. agropyri (Eriks.) Arth.

AVENA BREVIS Roth, LITTLE OAT. Of European origin, used in oat breeding.

Puccinia coronata Cda., crown rust. Nebr.
P. graminis Pers., stem rust. Minn.

AVENA BYZANTINA K. Koch, RED OAT. Cult. oat of E. Mediterranean region, grown in the southern U. S.

Ascochytula avenae Petr., white leaf spot. Oreg.
Cladosporium herbarum Lk., mold. Oreg., Wash.
Erysiphe graminis DC., powdery mildew. Oreg.
Fusarium culmorum (W. G. Sm.) Sacc., root rot. Oreg.
F. oxysporum Schl., secondary root rot. Oreg.
F. poae (Pk.) Wr., head blight. Oreg.
Helminthosporium avenae Eidam, leaf spot. Calif., Oreg.
H. sativum Pam., King & Bakke, root rot. Oreg.
Ophiobolus graminis Sacc., root & stem rot. Calif., Oreg.
Pseudodiscosia avenae Sprague & A. G. Johns., red leather-leaf. Oreg., Wash.
Puccinia coronata Cda. (II, III), crown rust. Calif., Nebr., Oreg., S. Dak., Wash. Var. avenae Eriks.
P. graminis Pers. (II, III), stem rust. Oreg.
Rhizoctonia solani Kühn, root rot, Oreg.
Septoria tritici Rob. forma avenae (Desm.) Sprague, leaf blotch. Oreg.
Ustilago avenae (Pers.) Jensen, loose smut. Oreg., Texas, Wash.
U. kolleri Wille, covered smut. Oreg., Wash.

AVENA FATUA L., WILD OAT. Introduced from Europe and widely but sparsely distributed in the U. S. except the Pacific Coast where it is a common weed; it is sometimes used for hay, furnishes food for wild-life, and enters into parentage of some cult. vars.

Ascochytula avenae Petr., leaf spot. Wash.
Colletotrichum graminicolum (Ces.) G. W. Wils. N. Dak.
Epicoccum neglectum Desm., leaf mold. Oreg.
Erysiphe graminis DC., powdery mildew. Oreg.
Fusarium culmorum (W. G. Sm.) Sacc., root rot. Oreg.
Helminthosporium avenae Eidam, leaf spot. Oreg.
H. sativum Pam., King & Bakke, root rot. N. Dak.
Heterodera marioni (Cornu) Goodey, root knot. Calif., Hawaii.

AVENA FATUA cont.

Pseudomonas coronafaciens (Elliott) Stapp, halo blight. Kans.
Puccinia coronata Cda. (II, III), crown rust. Central and Western States.
P. graminis Pers. (II, III), stem rust. Central & Western States. Var. avenae Eriks. & Henn.
P. rubigo-vera (DC.) Wint. (II, III), leaf rust. Var. agropyri (Eriks.) Arth. Calif.
Pythium arrhenomanes Drechsl., root browning. N. Dak.
Rhizoctonia solani Kühn, root rot. Oreg.
Septoria tritici Rob. forma avenae (Desm.) Sprague, leaf blotch. Oreg.
Ustilago avenae (Pers.) Jens., loose smut. Calif., Md., Wash.
U. kolleri Wille, covered smut. Kans., Oreg., Tex., Wash.

AVENA HOOKERI Scribn., SPIKE OAT. Native grass of the Rocky Mountain region from Mont. to N. Mex.

Colletotrichum graminicolum (Ces.) G. W. Wils., anthracnose. N. Dak.
Puccinia coronata Cda. (II, III), crown rust. Mont.

AVENA NUDA L. NAKED OAT. European cult., sometimes used in breeding.

Puccinia coronata Cda. (II, III), crown rust. Nebr., Oreg.
P. graminis Pers. (II, III), stem rust. Minn., Oreg.
Var. avenae Eriks. & Henn.
Ustilago avenae (Pers.) Jens., loose smut. Mo.

AVENA SATIVA L., COMMON OAT.

Alternaria sp. (sometimes as A. tenuis Nees ex Elliott), leaf & glume spot. Ind., Mo., N. Y., Vt.
Aphanomyces euteiches Drechsl., secondary root rot. Wis.
Botrytis cinerea Pers., head blight. Minn.
Cercosporella herpotrichoides Fron, foot rot. Oreg., Wash.
Cladosporium sp. (usually reported as C. herbarum Lk., conidial stage of Mycosphaerella tulasnei Jacz., which also is frequently present, and sometimes as C. gramineum Cda.), leaf and glume mold (secondary). Cosmopolitan.
Claviceps purpurea (Fr.) Tul., ergot. Widespread.
Colletotrichum graminicolum (Ces.) G. W. Wils., anthracnose. General.
Ditylenchus dipsaci (Kühn) Filip., stem nematode. Calif., S. Car.
Erysiphe graminis DC., powdery mildew. Widespread in the Northern States, also in Tex.
Fusarium avenaceum (Fr.) Sacc., head blight. Calif., Ohio.
F. culmorum (W. G. Sm.) Sacc., seedling blight, root rot. North Central and Pacific Coast States.

AVENA SATIVA cont.

Fusarium graminearum Schwabe, head blight, scab, seedling blight. Widespread in Northern U. S., also in Tex. Conidial stage of Gibberella zeae (Schw.) Petch.

F. moniliforme Sheldon, secondary root rot. N. Dak. Conidial stage of Gibberella fujikuroi (Saw.) Wr.

F. nivale (Fr.) Ces., snow mold. Conidial stage of Calonectria graminicola (Berk. & Br.) Wr.

F. oxysporum Schlecht., secondary root rot. N. Dak.

F. poae (Pk.) Wr., head blight. Oreg.

F. scirpi var. acuminatum (Ell. & Ev.) Wr., secondary root rot. N. Dak.

Helminthosporium avenae Eidam, leaf blotch. General. Conidial stage of Pyrenophora avenae Ito & Kurib.

H. sativum Pam., King & Bakke, root rot. Iowa, Mich., N. & S. Dak., Oreg.

Heterodera marioni (Cornu) Goodey, root knot. N. J., Hawaii.

Heterosporium avenae Cud., leaf mold. Oreg.

Leptosphaeria avenaria Weber, speckled blotch. Ind., Ky., Mass., Minn., Wis. Only the pycnidial stage, Septoria avenae, has been found in nature.

Marasmius tritici P. A. Young, collar rot. Ill.

Ophiobolus graminis Sacc., foot rot. Oreg.

Phyllachora graminis (Pers. ex Fr.) Fckl., black spot. Nebr.

Phyllosticta avenophila Tehon & Daniels, leaf spot. Ill.

Pratylenchus pratensis (DeMan) Filip., in roots. Tex.

Pseudodiscosia avenae Sprague & Johnson, red leather-leaf. Oreg., Wash.

Pseudomonas coronafaciens (Elliott) Stapp, halo blight. Widespread.

P. striafaciens (Elliott) Starr & Burkh., bacterial stripe. Widespread.

Puccinia coronata Cda. (II, III), crown rust. General, especially severe in the South. The form on oats has been designated forma avenae Eriks., and var. avenae Fraser & Ledingham; its C and I stages occur on Rhamnus spp., especially R. cathartica L.

P. graminis Pers. (II, III), stem rust. General. Only the race avenae Eriks. & Henn. occurs on this host; O and I on Berberis spp.

P. rubigo-vera (DC.) Wint. (II, III), leaf rust. Occasional, chiefly in the South; the race agropyri (Eriks.) Arth. has been identified on this host in N. Car. and Tex.

Pythium debaryanum Hesse, root necrosis. Iowa, Minn., N. & S. Dak., Oreg.

Rhizoctonia solani Kühn, root rot, sometimes virulent. Minn., N. Dak., Oreg.

Sclerospora macrospora Sacc., downy mildew. Miss.

Sclerotium rolfsii Sacc., seedling blight. Ark., Miss.

Scolecotrichum graminis Fckl., brown stripe. Ill., N. Y.

AVENA SATIVA cont.

(Septoria avenae Frank): Leptosphaeria avenaria.

S. tritici Rob. forma avenae (Desm.) Sprague, leaf spot. Oreg., Wash.

Ustilago avenae (Pers.) Jens., loose smut. General.

U. kolleri Wille, covered smut. General.

Wojonowicia graminis (McAlp.) Sacc., secondary root rot. Oreg., Wash.

Blast (sterility) -- physiological, probably high temperature and drought. General in some years.

Gray speck -- manganese deficiency. Ind., Kans., S. Car.

Red leaf -- physiological, usually associated with subnormal temperature during early growth. Northern U. S.

AVENA STERILIS L., ANIMATED OAT. Introduced from Europe, sometimes grown as a curiosity and locally established.

Pseudomonas coronafaciens (Elliott) Stapp, halo blight. Kans.

Puccinia coronata Cda. (II, III), crown rust. Kans.

P. graminis Pers. (II, III), stem rust. Calif., Mich.

AXONOPUS (GRAMINEAE)

AXONOPUS AFFINIS Chase, CARPETGRASS (1). Occurring on alluvial soil of the SE. Coastal Plain to Texas, sometimes used for forage and for lawns. Also A. COMPRESSUS (Swartz) Beauv. (2), a similar but less common sp., occurring in Fla., and A. FURCATUS (Flügge) Hitchc., BIG C., (3) of more general range in moister habitats.

Cerebella andropogonis Ces. (also C. paspali Cke. & Mass., and C. panici Tr. & Earle, probably synonyms), on Sphacelial stage of ergot. Md. to Fla. and La.

Claviceps sp., ergot. Gulf States.

Curvularia sp., on leaves. Fla. (2), Ga.

Dothichloë nigricans (Speg.) Chardon, black ring. Fla.

Fusarium graminum Cda., on spikes and seeds, often accompanying ergot. Ga., Miss., Tex. Reported as F. heterosporum Nees, or F. h. f. paspali Ell. & Ev.

Gnomonia iliau Lyon, on culms. Fla. (+ 2).

Helminthosporium sp., leaf spot. Tex.

H. ravenelii Berk. & Curt., on inflorescence. Miss.

Myriogenospora bresadoleana P. Henn., black streak. P. R.

Puccinia paspalicola (P. Henn.) Arth. (II, III), rust. P. R. C & I on Solanum spp.

Rhizoctonia solani Kühn, brown patch. Southern U. S., Hawaii.

Trichostroma axonopi Tehon, on leaves. P. R.

(DIVISION OF MYCOLOGY AND DISEASE SURVEY).

RUSTS AND OTHER DISEASES OF SAFFLOWER

I. L. Conners[1]

Introduction

Safflower (Carthamus tinctorius L.) has been cultivated in Egypt since ancient times, first as a source of a red dye obtained from the flowers and later as an oil-seed crop. (Gustav Hegi, Illustr. Fl. von Mittel-Europa 6(2): 986-989). It was an important dye plant in Europe around 1700, but its cultivation then declined and with the discovery of the fast aniline dyes it almost ceased to be grown. Today, safflower is being cultivated extensively in India and Egypt for its oil-seed and to a small extent in China, Japan, Turkestan and parts of Europe (F. Rabak, U.S.D.A. Circ. 366. 1935). It is the most important oil-seed crop in the Bombay Presidency where 500,000 to 600,000 acres are grown annually. In India the oil is used for food and as a soap oil. Recent tests in the United States (Rabak, l.c.) have shown the oil to possess properties useful in the paint, varnish and allied industries.

Since the revolution safflower has evidently been tested extensively in widely-separated regions of the Soviet Union as a source of oil. In the United States safflower has been under trial since 1925 and there appear to be possibilities in its culture in the Northern Great Plains and the far western states. In Canada the plant has been tested at Ottawa and in the Prairie Provinces. Safflower seed of good quality weighs 42-48 lb. per bu. and contains 22-28 per cent of oil. Safflower oil is composed of glycerides principally of unsaturated fatty acids. Its iodine number is higher than that of sunflower oil, but lower than that in the lowest linseed oils.

Rusts

Three rusts[2] are reported at the present time on safflower. One of these, Puccinia Carthami Corda, was observed for the first time in Canada in 1942. It was collected on safflower in the variety plots, Saskatoon, Sask., by Dr. R. C. Russell on September 3. Rust infection was light to moderate on several lines or varieties. The infection was noticeably heavier on some varieties than others when the same plots were examined on August 15, by Prof. T. C. Vanterpool. In Manitoba, the rust was collected at Morden, by Mr. W. E. Sackston on July 28. When the same plants were examined by Mr. B. Peturson on August 26, the severity of infection was estimated to be 20 per cent. Uredinia and telia, the only known spore stages for the species, develop in small scattered pulverulent pustules.

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[2] A fairly full account of our present knowledge of the distribution of these rusts and their hosts has been prepared and submitted for publication in Phytopathology.

The rust is readily distinguished from rusts occurring in North America on composites in the tribe Cynareae by its thick-walled teliospores, and by the absence of a systemic mycelium. The urediniospores are globose, relatively small, light chestnut brown with 3 equatorial germ pores, the latter character distinguishing it from certain closely related European species. The teliospores are globose to broadly ellipsoid, chestnut-brown, finely verrucose, uniformly thick walled, with the pores usually depressed from the apical position and with a hyaline, fragile, mostly deciduous pedicel. The species is adequately described and illustrated by J. C. Arthur (Manual of Rusts in U. S. and Canada p. 349. 1934).

The occurrence of this rust in Canada is of considerable interest as it has been reported only once previously in North America when it was collected at Cottage City, Mass., in 1895, and because safflower may yet be grown commercially in Canada as a source of vegetable oil.

Puccinia Carthami was described by Corda in 1840 from material collected on Carthamus tinctorius at Prague, Bohemia. By 1902 (Sydow, Monograph. Ured. 1: 35), it was known in Silesia, Bohemia, in Egypt, and in eastern India and Japan. Since then it has been reported to occur rather widely on cultivated safflower in the Azov-Black Sea region, the Caucasus, and adjacent sections of the Soviet Union. (W. Tranzschel, Conspect. Ured. p. 372. 1939). Its presence in Egypt, India, and Japan has been confirmed by additional records or specimens. It is also known to occur in Transylvania, Crete, probably in Italy and doubtfully in Spain.

Puccinia Carthami is not confined to Safflower, but occurs on other species of Carthamus, viz. C. glaucus Bieb., C. lanatus L. and C. Oxyacantha Bieb. The doubtfully distinct species, Puccinia Kentrophylli Syd., is also reported on C. glaucus and C. lanatus. The published descriptions of P. Carthami and P. Kentrophylli were compared with seven collections of P. Carthami. As a result of the comparison, there appeared to be no sound morphological basis for the separation of the two rust species.

The geographical range of Puccinia Carthami is enlarged somewhat when the records on the other species of Carthamus are added to that on safflower. The rust occurs on the latter hosts in additional districts of the Soviet Union, in Crete and in New South Wales.

A closely related species is Puccinia Carduncelli Syd. which has been reported on Carduncellus caeruleus (L.) Less. in Sicily, Spain, and Algeria, and on Carthamus calvus (Boiss. & Reut.) Bott. in Morocco. The species differs from P. Carthami in possessing urediniospores, which are ovate, rather than ellipsoid, and with two superequatorial germ pores, rather than three in an equatorial position.

As safflower is a cultivated, rarely adventive plant in several countries of the world including Canada and the United States, the scattered appearance of Puccinia Carthami in these countries must be due to its chance introduction as suggested by the Sydows (Monograph. Ured. 1: 35. 1902). In Europe there is the possibility that a rust on some native host might have spread to safflower, but such a possibility seems very remote in North America. It would appear more probable that spores carried on the seed might cause infection of the plant. Samples of saffflower seed were secured. A portion from each was washed in water, the washings centrifuged and the sediment placed on a slide, cleared in lacto-phenol and

examined microscopically. Dr. R. C. Russell also examined a series of samples at Saskatoon, Sask. It was abundantly demonstrated that the seed upon occasion may carry a heavy spore-load.

Moreover, from this examination, it was concluded that the rust occurred at Brooks, Alta., in 1939, at Ottawa at least in 1940 and at Indian Head in 1941 and 1942, in addition to the collections at Saskatoon, Sask., and Morden, Man. The rust, however, was not found in the safflower plots at Winnipeg, Man., or Lethbridge, Alta.

From the spore-load on the seed it has been inferred that the heaviest infection so far encountered was at Brooks, Alta. However, when this seed was planted at Ottawa in 1940, it yielded a crop lightly infected. This fact suggests that seasonal conditions play an important part in rust development. If the appearance of this rust in Canada is due to infection from spores carried on the seed, it seems probable that the rust reached Ottawa from Brooks on seed of a variety, which had been imported in its turn from Hungary, and had spread from there to the other points. This assumption is based on the fact that the Cereal Division at Ottawa has supplied, directly or indirectly most of the lines under test in Western Canada. How destructive the rust may be has never been reported.

The second rust on safflower is Puccinia verruca Thüm. It is quite a different appearing rust as it forms compact telia aggregated into relatively large groups. On safflower, it is known only from the Soviet Union, where it was described on this plant as Puccinia Jaczewskii Tropova. K.E. Mourashkinsky (R.A.M. 6: 354-5. 1928) reported it under the name "Puccinia Centaureae" as a minor disease of safflower at Omsk, where it was very prevalent on Centaurea scabiosa L. Later, he (R.A.M. 14: 493-4. 1936) showed that it was identical with Puccinia verruca Thüm, a species recorded on many species of Centaurea in Europe, Asia and North Africa, but not in North America. Puccinia Sommieriana Sacc. described on Carthamus lanatus from Malta is evidently another synonym. This conclusion was reached from a comparison of a specimen of P. Sommieriana from the south of France with one of P. verruca on Centaurea from Italy.

Like many other microcyclic species, Puccinia verruca with its telia on Centaurea and now also on Carthamus, has been correlated with the corresponding long-cycled rust, Puccinia Centaureae-Caricis Tranz. which has its uredinia and telia on Carex and aecia on Centaurea. To be strictly correct, this long-cycled rust should be known as Puccinia arenariicola Plowr.

The third rust known on safflower is a rare aecium, Aecidium Carthami Dietr., collected by him in Ehstland (Esthonia) and reported by M. M. Rodighin (R.A.M. 19: 115-6. 1940) from the Saratov district of the Soviet Union. Aecidium Carthami appears to have been founded on an error, but evidently Rodighin collected an aecium on safflower. Tranzschel has suggested that this aecium is connected with Puccinia Centaureae-Caricis. It is not connected in any way with Puccinia Carthami, which has been inferred in the literature.

Other Diseases

A review of the literature has revealed that safflower is subject to several other diseases. An annotated list has been prepared of these

records. No claim to completeness is made.

Ascochyta Carthami
Recorded from the Volga region (M.N. Rodighin, R.A.M. 19: 115-6. 1940). Where the species is described and what its relation is to Ascochyta sp. (q.v.) have not been established.

Ascochyta sp.
Recorded from the North Caucasus (Mme. E.S. Kvashnina, R.A.M. 7: 763-5. 1928).

Botrytis cinerea Pers.
Grey rot of inflorescence. Found in Ukraine in 1934 (I.V. Bohovik, R.A.M. 16: 750. 1937).

Bremia Lactucae Regel f. Carthami Milovtzova n.f.
Downy mildew. In the vicinity of Kharkov. (Mme. M.O. Milovtzova, R.A.M. 17: 838. 1938).

Cercospora Carthami Sundar. & Ramakr.
Leaf spot. Found in epidemic form in Madras, India, in 1921, recorded in 1922, 1924 and 1925. (S. Sundararaman & T. S. Ramakrishnan, R.A.M. 8: 109-10. 1929 and E. J. Butler & G. R. Bisby, Fungi of India p. 141. 1931). First recorded as C. sp. (Wm. McRae. R.A.M. 3: 569-71. 1924).

Cercosporella Carthami Mourash. n. sp.
Black leaf spot. Minor disease at Omsk, Western Siberia (K.E. Mourashkinsky R.A.M. 6: 354-5. 1927). Recorded from the Volga region (M.N. Rodighin, R.A.M. 19: 115-6. 1940). This needs to be compared with the next species.

Cercosporina Carthami Syd.
Collected near Los Banos, Prov. Laguna, Philippines (H. & P. Sydow, Ann. Myc. 11: 406. 1913; C. F. Baker, Fungi Malayana 125). Recorded from the North Caucasus (Mme. E.S. Kvashnina, R.A.M. 7: 763-5. 1928).

Colletotrichum Capsici (Syd.) Butler & Bisby
Cause of a wilting in India (T.S. Ramakrishnan, R.A.M. 20: 317. 1941).

Erysiphe Cichoracearum DC. f. Carthami Milovtzova n.f.
Powdery mildew. Observed in the vicinity of Kharkov (Mme. M.O. Milovtzova, R.A.M. 17: 838. 1938).

Gloeosporium Carthami Fukui, Hori & Hemmi
Recorded from Japan and Indiana (F. Rabak, U.S.D.A. Circ. 366. 1935, revised).

Helminthosporium sp. and Fusarium sp.
Attacked the inflorescence and caused a rot of the seed at Omsk, Western Siberia. The disease was of minor importance (K.E. Mourashkinsky, R.A.M. 6: 354-5. 1927).

Leveillula (Oidiopsis) taurica (Lév.) Arn. f. Carthami
Powdery mildew. In Russian Central Asia (N.G. Zaprometoff R.A.M. 8:338-9, 1929) and reported from the North Caucasus (Mme. E.S. Kvashnina, R.A.M. 7: 763-5, 1928).

Macrosporium Carthami Rodighin n. sp.
Described from the Volga region, causes reddish-yellow later brown spots (M.N. Rodighin, R.A.M. 19: 115-6, 1940). In the U. S. (F. Rabak, U. S. D. A. Circ. 366. 1935). This is apparently an Alternaria.

Marsonia Carthami T. Fukui
Reported from Japan (Journ. Scient. Agr. Soc. 5: 381-3. 1916; Mycologia 9: 169. 1917).

Oidium sp.
Powdery mildew. A minor disease at Omsk, Western Siberia. The species was not identified (K.E. Mourashkinsky, R.A.M. 6: 354-5, 1927).

Phoma Carthami Rodighin n. sp.
A saprophyte on dried stems described from the Volga region. (M.N. Rodighin, R.A.M. 19: 115-6, 1940).

Phyllosticta Carthami Roldan n. sp.
Leaf spot. Found in the Philippines (E.F. Roldan, R.A.M. 16: 209, 1937). This species is antedated by P. Carthami Tropova (q.v.); it must be renamed or reduced to synonymy.

Phyllosticta Carthami Tropova
Described in 1934 by A. Tropova. Reported from the Volga region (M.N. Rodighin, R.A.M. 19: 115-6, 1940).

Ramularia Carthami Zaprometr. n. sp.
Brown leaf spot. Described from material collected in Turkestan 1924 (N.G. Zaprometroff, R.A.M. 7: 165, 1928 and 6: 123-4, 1927). Recorded from the Volga region (M.N. Rodighin, R.A.M. 19: 115-6. 1940).

Sclerotinia sclerotiorum (Lib.) de Bary
Wilt. Found at Omsk, Western Siberia; safflower appeared to be very susceptible (K.E. Mourashkinsky R.A. M. 6: 354-5. 1927). It caused serious damage as a wilt at Pusa in 1920 and was found later elsewhere in India. (S.D. Joshi, R.A.M. 3: 650-1. 1924 and E.J. Butler and G.R. Bisby, Fungi of India p. 14. 1937). Also recorded for North America. (A.B. Seymour Host Index etc., p. 690. 1929) and from Virginia, Indiana, and North Dakota (F. Rabak, U.S.D.A. Circ. 366. 1935).

Septoria Carthami Mourash. n. sp.
White leaf spot. Extremely prevalent in the experimental field of the Siberian Academy of Agriculture, Omsk, Western Siberia (K.E. Mourashkinsky, R.A.M. 6: 354-5, 1927). The fungus is believed to have been introduced into Western Siberia with infected seed (same author, R.A.M. 14: 493-4. 1935). Recorded for the first time in Bulgaria (I. C. Kov-

achevsky, R.A.M. 18: 413. 1939). Recorded from the Volga region (M.N. Rodighin, R.A.M. 19: 115-6. 1940). Also recorded from the United States (F. Rabak, U.S.D.A. Circ. 366. 1935). It should be noted that Septoria Cirsii Niessl. is reported by Oudemans (Enum. syst. fung. 4: 1096) on Carthamus lanatus, based apparently on a record in Rev. Myc. 18: 80; a specimen in Roumeguère, F. Gall. 6985 is cited.

Stagonospora carthamicola Rodighin n. sp.

A saprophytic species on dried stems described from the Volga region (M.N. Rodighin, R.A.M. 19: 115-6, 1940).

(REPRINTED FROM MIMEOGRAPHED UNNUMBERED PUBLICATION ISSUED BY CENTRAL EXPERIMENTAL FARM, OTTAWA, CANADA. MARCH 10, 1943).

RELATIVE PREVALENCE AND GEOGRAPHIC DISTRIBUTION OF VARIOUS EAR ROT FUNGI IN THE 1942 CORN CROP[1]

P. E. Hoppe

This is a report of the results of the 10th annual survey of the relative prevalence and geographic distribution of corn-ear-rot fungi as indicated from platings of that portion of the crop reaching terminal markets. The results of the previous surveys have been reported annually (Plant Dis. Reptr. 18: 186-189, 20: 26-30, 20: 312-316, 21: 222-224, 22: 234-241, 23: 142-148, 24: 210-213, 25: 148-152, and 26: 145-149). These surveys have been made possible through the active cooperation of the Grain Products Branch, Food Distribution Administration, and grain inspectors licensed under the United States Grain Standards Act. Samples containing the sound and the commercially damaged kernel separates from samples of carload lots of corn of known origin are sent to the Chicago office of the Grain Products Branch, Food Distribution Administration, for review, after which they are sent to the writer. The kernels in the damaged separates then are plated to identify the fungi associated with the damaged kernels. In the 1942 survey, the kernels were first surface-sterilized in a 10 percent solution of the commercial product "Klenzade" (4.62 percent sodium hypochlorite) after which they were plated on slightly acidified potato dextrose agar, incubated for 4 days at room temperatures, and then the organisms were identified.

Results of 1942 Survey

The importance of particular environmental conditions as they affect specific ear rot diseases again was illustrated in the 1942 results. Premature killing by early frosts of considerable corn acreages in areas

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[1] Survey conducted by the Grain Products Branch, Food Distribution Administration, U. S. Department of Agriculture, the Wisconsin Agricultural Experiment Station, and the Division of Cereal Crops and Diseases, Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration, U. S. Department of Agriculture, cooperating.

Table 1. Average percentages, by States and regions, of fungi recovered in plating damaged kernels from samples obtained from carload lots of corn arriving at terminal markets (1942 crop).

Origin of samples	No. carloads sampled	Total damaged kernels	Sound kernels	Diplodia zeae	Gibberella zeae	Fusarium moniliforme	Other fusaria	Nigrospora spp.	Mucors	Penicillium spp.	Aspergillus spp.	Sterile kernels	Miscellaneous	An unidentified fungus [3]
Atlantic Seaboard States:														
Md.	24	8.9	1.1	51.9[1]	3.1	28.3	-	0.6	2.0	4.5	-	0.5	7.1	0.9
Del.	3	10.1	.7	53.4	4.8	20.3	1.4	-	1.4	2.7	-	-	15.3	
Average:	27	9.0	1.1	52.1	3.3	27.4	0.2	0.5	1.9	4.3	-	0.4	8.0	0.8
East-Central States:														
Ohio	8	2.8	-	34.5	15.0	7.3	-	10.6	.6	1.9	-	2.0	28.1	
Ind.	8	4.2	.6	67.5	6.1	12.8	-	1.5	2.1	3.7	-	-	5.7	
Ill.	94	4.6	.6	70.5	3.6	6.4	.1	2.5	1.8	3.5	.1	2.2	8.3	.4
Average:	110	4.4	0.5	67.7	4.6	6.9	.1	3.0	1.8	3.4	.1	2.0	9.6	0.3
Southern States:														
Tenn.	3	6.6	-	38.1[2]	-	54.8	-	-	.9	-	-	-	6.2	
Ark.	1	4.6	2.2	35.6	-	60.0	-	-	-	-	-	-	2.2	
Average:	4	6.1	.5	37.5	-	56.1	-	-	.7	-	-	-	5.2	
Northwestern States:														
Minn.	19	10.5	0.1	5.1	9.6	3.5	0.3	33.1	0.4	1.9	-	7.8	38.2	
N.Dak.	2	21.5	2.0	-	7.0	1.0	-	34.0	-	1.0	-	9.0	46.0	
S.Dak.	14	8.1	.3	19.1	9.7	11.6	.4	29.7	.9	.4	-	4.2	23.7	
Average:	35	10.2	.3	10.4	9.5	6.6	0.3	31.8	0.6	1.2	-	6.4	32.9	
West-Central States:														
Iowa	56	4.8	0.8	44.5	8.5	10.1	.3	10.6	2.1	1.8	.1	4.4	16.8	
Mo.	2	4.6	1.1	56.3	-	26.0	-	-	4.1	3.5	-	1.1	7.8	
Average:	58	4.8	.8	44.9	8.2	10.7	.2	10.2	2.2	1.9	.1	4.3	16.5	
Western States:														
Neb.	30	4.6	.2	22.1	2.0	29.1	.4	8.6	4.7	4.1	.4	6.6	21.8	
Kan.	7	3.4	3.6	37.0	.4	40.1	-	1.5	4.9	2.5	-	1.5	8.5	
Colo.	9	10.8	.6	.2	.2	29.9	.2	23.8	5.2	1.1	.2	13.2	25.4	
Average:	46	5.6	.8	20.1	1.4	30.9	.3	10.5	4.8	3.3	.3	7.1	20.5	

Footnotes to Table 1:

[1] 619 cultures D. zeae, 2 of D. macrospora.
[2] 42 " " " 2 " " "

[3] A fungus frequently found in eastern samples and occasionally in those from elsewhere. Its pathogenicity as a stalk and ear rot fungus has been demonstrated by the writer in artificial inoculation experiments.

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north and northwest of the Corn Belt proper, resulted in a heavy incidence of Nigrospora ear rot in these areas. Likewise, a period of damp and rainy weather during the silking period of the crop throughout much of the same general area, resulted, as expected, in more than the usual amount of Gibberella-rotted grain. A summary of the results of the 1942 survey, for individual States and groups of States, is given in table 1. A brief discussion of the results follows:

ATLANTIC SEABOARD (Maryland, Delaware). Plating results indicate a heavy incidence of Diplodia ear rot in these States in 1942. The samples averaged 9 percent "total damaged kernels"[3] and plated 52.1 percent Diplodia zeae and 27.4 percent Fusarium moniliforme. The importance of any other single fungus in the 1942 samples was relatively negligible. The isolation of 2 cultures of D. macrospora from Maryland samples is of unique interest. According to records in the Division of Mycology and Disease Survey, this is the first recorded incidence of this species of Diplodia in Maryland. Of further interest is the fact that both cultures of D. macrospora developed scolecospores, a spore form hitherto undescribed in this species.

EAST-CENTRAL STATES (Ohio, Indiana, Illinois). Diplodia zeae, as usual, was overwhelmingly the predominant fungus in this area, Illinois samples plating 70.5 percent. Gibberella zeae, which ran higher in these States than in 1941, accounted for 15 percent of the damaged kernels in the Ohio samples, indicating a rather common occurrence of Gibberella ear rot in the localities from which the samples originated.

SOUTHERN STATES (Tennessee, Arkansas). Only 4 samples were obtained from the South, but the plating results were not unlike those of former years when it was found that Diplodia zeae and Fusarium moniliforme accounted for practically all the damaged kernels.

NORTHWESTERN STATES (Minnesota, N. Dakota, S. Dakota). Nigrospora sp. was the principal fungus isolated from the samples from these States, accounting for nearly one-third of the damaged kernels. Diplodia zeae and Gibberella zeae, 10.4 and 9.5 percent, respectively, were next in importance. The samples from this general area fluctuated considerably in the incidence of D. zeae, Nigrospora sp. and storage rot fungi, but were relatively uniform for Gibberella zeae, indicating a more general distribution of gibberella ear rot throughout the Northwestern states. The high percentages for Nigrospora sp. in this region, where so much of the corn crop was prematurely killed by early frosts, offer support to the common supposition

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[3] The U. S. Standards for corn state that "Damaged kernels shall be kernels and pieces of kernels of corn which are heat damaged, sprouted, frosted, badly ground damaged, badly weather damaged, or otherwise materially damaged."

that nigrospora ear rot is primarily a disease of immature corn.
WEST-CENTRAL STATES (Iowa, Missouri). Diplodia zeae, Fusarium moniliforme, Nigrospora sp., and Gibberella zeae, 44.9, 10.7, 10.2, and 8.2 percent, respectively, were the ranking fungi. Neither Nigrospora sp. nor G. zeae were plated from the 2 samples obtained from Missouri.
WESTERN STATES (Nebraska, Kansas, Colorado). Fusarium moniliforme always has been the predominant fungus in the samples from this area, and the 1942 results were no exception. Diplodia zeae, Nigrospora sp., and Gibberella zeae all ran higher in the Western states than in average years and this resulted in a lower relative prevalence for F. moniliforme than usually has been recorded.
(DIVISION OF CEREAL CROPS AND DISEASES, BUREAU OF PLANT INDUSTRY, SOILS, AND AGRICULTURAL ENGINEERING).

GENERAL SEED TREATMENT RECOMMENDATIONS FOR FIELD CROPS*

While the following recommendations are probably of general application it is recognized that local conditions may exist that require special adaptation in seed treatments either as to rates of application, or materials, or both. Final recommendations, naturally, should come from the local pathologist, and it is intended that these should serve only in the absence of more specific directions. However, this list may fairly accurately represent the general practice over a considerable area, inasmuch as a number of pathologists were consulted on its preparation.

WHEAT, OATS, BARLEY, FLAX

New Improved Ceresan, 1/2 oz. per bu. - If there should be local shortages of this material, it would probably be advisable to extend the supply as far as possible by using only 1/4 oz. per bu. and treating 2 weeks or more ahead of planting.

CORN

Semesan Jr., 1-1/2 oz. per bu. - There is some evidence that Semesan Jr. may be reduced to 3/4 oz. in emergencies with little loss of effectiveness.

Barbak D (or C) 1-1/2 oz. per bu.

SORGHUM

Copper carbonate, 20 percent or 50 percent, 2 to 3 oz. per bu. - May possibly be cut to 1 to 2 oz. per bu. as an emergency measure.

New Improved Ceresan, 1/2 oz. per bu. - Possibility of injury is reported from overdose or from storing treated seed in closed containers.

Sulphur, 2 to 3 oz. per bu. as a poor third choice. - Will control smut but does not increase seedling emergence, and may cause injury.

OTHER MATERIALS

Arasan and Spergon. - There are some favorable reports on these compounds, especially the former, from tests on sorghum, flax, and corn. However in view of the lack of extensive tests as well as of their limited availability, it seems inadvisable to recommend them at this time.

* Prepared March 1943, at the request of the War Committee of the American Phytopathological Society by M. B. Moore from experimental results obtained by the Society's committee on seed treatments, and from information furnished by the following pathologists: Drs. W. F. Buchholtz, K. Starr Chester, A. A. Dunlap, W. J. Greaney, W. J. Henderson, D. E. Hoffmaster, J. B. Kendrick, Benjamin Koehler, R. W. Leukel, J. E. Livingston, L. E. Melchers, H. A. Rodenhiser, and C. M. Tucker. It is realized that this is by no means a complete survey of pathologists who are concerned with seed treatment work.
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SOME RELATIONS OF POTATO PRODUCTION, LATE BLIGHT INFECTION, AND WEATHER IN 1942 TO THE CURRENT POTATO SITUATION[1]

Freeman Weiss

Without attempting a detailed analysis of the complex relationships suggested in the title, since data adequate for the purpose do not exist, it is nevertheless of professional interest to plant pathologists to determine whether late blight is a factor of significant magnitude in the present potato situation. On a post hoc ergo propter hoc premise this situation might be attributable to the ravages of this disease, which was probably the most conspicuous pathological event of 1942. There were, however, many other factors involved affecting the validity of such a premise, and logical conclusions can be reached only after a consideration of the available data with reference to all these factors. Yet to a great extent, as far as the influences of late blight are concerned, the facts speak for themselves.

It must first be conceded that various other factors have had a real but at present largely undeterminable part in the present potato situation, such as deficiencies of transportation, increased consumption especially by the armed forces and also for dehydration and overseas shipment, and retardation or damage by cold weather affecting the early crop in the South.

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1 The sources of statistics on potato production and disposition quoted here are (1) the 1942 annual summary of crop production issued by the Crop Reporting Board of the Bureau of Agricultural Economics, U. S. D. A., Dec. 1942; (2) a summary of farm production, farm disposition, and value of principal crops, 1941-1942, issued April 23, 1943 by the same Bureau. Mr. Reginal Royston, of the Agricultural Marketing Service, kindly made available certain data on potato shrinkage in storage that were not included in this summary.

There is also the matter of an increased demand for seed potatoes, which normally takes 12 to 13 per cent of the crop, both to meet a 16 per cent increase in the commercial acreage goal for 1943 and the unpredictable quantity of potatoes that will be planted in Victory gardens.

Potato production in 1942 as compared with 1941 in the 12 principal late and intermediate potato States (which normally grow about 80 per cent of the total U. S. production) is shown in Tables 1 and 2. Differences from 1941 levels are indicated by plus or minus signs. For 30 late and intermediate potato States the changes from 1941 to 1942 were: acreage +0.5, production +3.0, and yield per acre +3.5 per cent. The acreage in 1942 was nearly 23 per cent, and production about 4 per cent below the 10-year average 1930-39, but yield per acre was 24 per cent higher. Production of early potatoes in 1942 was 13 per cent above 1941 and 37 per cent above 1941 and 37 per cent above the 10-year average.

Based on consumption levels of 1941 there should have been an ample potato production in 1942; and also enough potatoes to go around based on the 1930-39 average, though with a slight deficiency of potatoes for winter storage.

Did then the stocks of potatoes that appeared adequate at the conclusion of the 1942 harvest suffer exceptional shrinkage in storage, perhaps as a result of late blight tuber rot, so that by spring a just adequate supply had become deficient? Some data on the disposition of potatoes by growers are presented in Table 3. Column 1 shows the percentage of the crop that is saved for seed, and column 2 the percentage used for home consumption, on the farms where the stock is grown; column 3 shows the shrinkage and loss (both in per cent and in 1000 bushels) occurring after harvest up to January 1, and column 4 shows the proportion sold after all other forms of disposition (including amounts fed to livestock) are deducted. These figures neither reveal a large increase in shrinkage, nor a corresponding decline in salable product, when differences in the amounts saved for seed and consumed in the home are taken into consideration. Although only about half of the total storage term is covered, it should be remembered that loss due to late blight is usually manifest early in this period. Furthermore, inspections of potato shipments that arrived in Eastern markets during the latter part of the storage season indicated exceptionally good quality. Thus, with local exceptions, among which should be mentioned portions of the potato crop in western New York, Pennsylvania, Wisconsin, Minnesota and North Dakota, spoilage due to late blight or other rot in storage was not a large factor, and was but little if any greater than average.

Of course differences expressed in percentage may be slight but, on a crop of the magnitude of potatoes, may still be large in actual amount. The figures in Table 3 showing shrinkage in storage when expressed in bushels are impressive, amounting to well over 1,000,000 bushels in each of several States. Late blight rot was probably a significant factor in much of this loss. Likewise, the figures in Tables 1 and 2 showing reduced potato production in 1942 as compared with 1941 in all the Eastern and some of the Central States, must be seriously considered in allocating the causes of the present potato situation, especially in the Eastern States. Late blight was almost certainly the principal factor in this curtailment of production, since weather conditions were generally exceptionally favorable for high potato yields, and other causes of loss such as heat and drought injury, hopper burn, early blight and virus diseases were barely

Table 1. 1942 Potato production in the 12 largest potato states compared with 1941 showing (a) reduction or gain in acreage harvested, (b) yield per acre, and (c) total production.

State and rank 1942	Acreage harvested (1,000 acres)			Yield per acre (bushels)			Production (1,000 bushels)		
	1941	1942	Diff.	1941	1942	Diff.	1941	1942	Diff.
1. Maine	151	156	+ 5	285	270	- 15	43,035	42,120	- 915
2. Idaho	122	133	+11	225	230	+ 5	27,450	30,590	+3,140
3. New York	187	189	+ 2	148	145	- 3	27,676	27,405	- 271
4. Minnesota	206	204	- 2	78	95	+ 17	16,068	19,380	+3,312
5. North Dakota	143	133	-10	105	135	+ 30	15,015	17,955	+2,940
6. Pennsylvania	165	157	- 8	130	112	- 18	21,450	17,584	-3,866
7. Colorado	67	74	+ 7	187	230	+ 43	12,529	17,020	+4,491
8. Michigan	182	169	-13	110	98	- 12	20,020	16,562	-3,458
9. Nebraska	74	74	0	130	174	+ 44	9,620	12,876	+3,256
10. California (late crop)	32	34	+ 2	295	320	+ 25	9,440	10,880	+1,440
11. New Jersey	55	56	+ 1	188	181	- 7	10,340	10,130	- 204
12. Wisconsin	158	150	- 8	91	67	- 24	14,378	10,050	-4,328

Table 2. Gain or loss in production in the United States as a whole and in the principal regions. Late or main crop only.

States	Acreage harvested (1,000 acres)			Yield per acre (bushels)			Production (1,000 bushels)		
	1941	1942	Diff.	1941	1942	Diff.	1941	1942	Diff.
United States	2,226	2,215	+11	139.2	144.1	+ 4.9	308,404	317,810	+ 9,406
Eastern States	503	502	- 1	183.2	173.5	- 9.7	92,161	87,109	- 5,052
Central States	718	688	+30	93.6	97.0	+ 3.4	67,221	66,763	- 458
Western States	414	432	+18	196.0	215.7	+19.7	81,160	93,356	+12,196

Table 3. Disposition of potatoes after harvesting, showing proportion saved for seed, consumed in the home, and sold. A small percentage fed to livestock not included.

State	(1) Seed Pct.		(2) Home use Pct.		(4) Sold Pct.		(3) Shrinkage Pct.		1,000 bu.
	1941	1942	1941	1942	1941	1942	1941	1942	1942
Maine	5	5	2	2	89	89	3.5	3	1,474
Idaho	8	8	1.6	1.3	79	85	6	5	1,530
New York	8	9	13	12.5	73	73	4	3.5	959
Minnesota	15	14	27	21	47	55	7	7	1,357
North Dakota	13	10	10	8	70	71	5	8	1,436
Pennsylvania	9.5	11.5	17	18.5	68	65	3	3.5	615
Colorado	9	6.5	1.6	1.2	75	84	7	8.5	1,021
Michigan	13	17	17	17.5	58	56	6	6	994
Nebraska	6	5	14	11	72	76	6	6.5	837
California	1.5	3	0.5	0.5	92	95	4.5	1.7	394
New Jersey	2.5	3	2	2	94	93	2	2.1	212
Wisconsin	12.5	18	29	34	41	36	10	7	704

mentioned in reports to the Disease Survey by collaborators. Severe losses from late blight were reported in Maryland, Minnesota, Pennsylvania, Rhode Island, South Dakota, West Virginia and Wisconsin, and above average losses in Colorado, Florida, Michigan, New Jersey, New York, North Dakota, and Texas.

A reduction of 5 1/2 million bushels in the potato production of the Eastern and Central States from the 1941 level that was itself substantially below the last 10-year average is certain to be reflected in a serious shortage. The superlative production of the far Western States, correlated with exceptionally favorable weather, did, however, keep the national potato situation from being much more serious than it is. Late blight was important regionally but was apparently not a major determining factor in the national situation.
(DIVISION OF MYCOLOGY AND DISEASE SURVEY).

BRIEF NOTES ON PLANT DISEASES

APPLE SCAB AND RUST DEVELOPMENT IN NEW YORK: (Reports from Weekly News Letter for dates indicated): Hudson Valley -- Perithecia of the scab fungus, Venturia inaequalis, from the southern sections are well advanced and the majority of them contain spores ready for discharge. From the northern sections perithecia in early locations have an abundance of mature spores while in the later locations only a few spores are ready for discharge.

In general it can be expected that ascospores will be present during rain periods from now until about the middle of June.

Apple cedar rust, Gymnosporangium juniperi-virginianae, galls are ready to discharge spores with the next rain. Quince rust, G. clavipes, spores are

not yet ready for discharge in northern sections. - D. H. Palmiter, Poughkeepsie (May 10).

Western New York -- Scab perithecia were mature and shooting spores during the past 2 rain periods in Wayne County. - W. D. Mills (May 3).

APPLE SCAB IN MARYLAND: Careful observations on apple scab development during the past month in commercial orchards over the entire State indicate that this is likely to be a bad scab year. Scab spores are beginning to shoot just ahead, and in some fruit sections, during the blossom stage. In most fruit sections of Maryland this year, the pre-blossom, petal-fall and first cover sprays are very essential in controlling apple scab.

From one to three visits have been made to all commercial fruit growing sections of Maryland this spring, and 2-3 samples taken from 1200 or more selected apple scab leaves collected from 45 orchards, were examined with the microscope in the orchard at once, or in the laboratory as soon thereafter as possible. From these observations, scab spore development in Maryland has been recorded as follows:

Latest Date Observed	Orchards Located Near	Stage of Scab Perithecia Development: Immature %	"Banana" Stage %	Mature Spores %	Spores may shoot about
April 4-5	Berlin	21	74	5	At once
	Easton	22	73	5	At once
	Bridgesville	35	65	0	Apr.13-17
	Salisbury	90	10	0	Apr.15-18
April 6	Glen Burnie	43	57	0	Apr.12-15
April 7	Towson	82	18	0	Apr.17-20
April 9	Ellicott City	70	30	0	Apr.17-20
April 12	College Park	60	30	10	At once
April 17	Mt. Airy	50	50	0	Apr.21-23
	New Windsor	55	45	0	Apr.25-27
April 19	Frederick	55	45	0	Apr.25-28
	Williamsport	57	43	0	Apr.23-25
	Rockville	40	58	2	Apr.23-25
April 20-21	Hancock	59	41	0	Apr.25-28
April 20	Clear Springs	50	45	5	Apr.23-25
April 21	Thurmont	50	50	0	Apr.28-30
	Smithsburg	57	43	0	Apr.30 - May 3
	Emittsburg	80	20	0	Apr.30 - May 4
April 24	Sykesville	50	50	0	Apr.30 - May 3

Since the above observations have been made cold weather and absence of rain may delay initial spore discharge from 5-7 days for some sections of Western Maryland. Following several late freezes many enlarged perithecia appear to have undeveloped asci and may not produce spores this season. (E. A. Walker, University of Maryland. April 30).

BLUE MOLD OF TOBACCO IN SOUTH CAROLINA: Blue mold [Peronospora tabacina] was more severe in South Carolina in 1943 than it was in any of the 3 previous years. Plant mortality in the main belt was very high and as a consequence tobacco acreage may be considerably reduced. The percentage of the crop set will depend on transplanting conditions during the second and third weeks of May. Plants were late this year because of early freezes, and blue mold has caused an additional delay of 2 to 4 weeks.

Tests with blue mold fungicides at the Pee Dee Station, Florence, South Carolina, gave results as follows: Fermate at 4 lbs. per 100 gals., double the rate used earlier in Georgia, gave good control of blue mold and caused no plant injury. Spergon at the same rate was somewhat less effective but gave good control. Treatments that also gave satisfactory blue mold control were the regular copper oxide-oil, benzyl salicylate-oil, and bismuth salicylate-Vatsol. Dust treatments with Fermate 3%, Spergon 10%, and bismuth salicylate 10% gave some very promising results. Taken in general the results indicate that under the severe blue mold conditions that prevailed in South Carolina this year, a number of fungicides proved entirely satisfactory from the viewpoint of practical control. Growers in South Carolina made no general use of blue mold control measures, but a few used the paradichlorobenzene gas treatment and obtained excellent control.

(T. W. GRAHAM AND E. E. CLAYTON, COOPERATIVE INVESTIGATIONS BUREAU PLANT INDUSTRY, SOILS, AND AGRICULTURAL ENGINEERING, U. S. DEPT. AGR. AND THE SOUTH CARCLINA AGRICULTURAL EXPERIMENT STATION. MAY 7, 1943).

LITERATURE NOTE: "POTATO REFUSE PILES AS A FACTOR IN THE DISSEMINATION OF LATE BLIGHT": Reiner Bonde and E. S. Schultz conclude that the chief source of primary late blight infection is the potato cull pile and that the destruction of waste potatoes would do much to prevent the spread of late blight and of virus diseases as well. They summarize their results as follows (Maine Agr. Exp. Stat. Bull. 416. March 1943):

Late blight of potato still causes large losses in Maine in spite of the extensive spray program being conducted by the farmers for its control.

A study was conducted for the purpose of determining the primary source of infection in Aroostook County, Maine. The writers have found only one case where late blight in a field had originated from a diseased seed tuber which had been planted.

Attempts to create late-blight epidemics by planting diseased seed tubers have failed.

Surveys made over a period of five years have shown that late blight often develops early in the season on plants growing in potato refuse piles and from there is disseminated by air currents to nearby fields before the farmers have begun to spray.

It is concluded that the refuse or cull pile is the chief source of primary late-blight infection and that the elimination of this source of infection would do much to prevent the spread of the disease. Methods of destroying the refuse piles are being tried.

Burning or incinerating waste potatoes is recommended as a much better method of disposal than discarding them on a dump pile.

APRIL WEATHER

(Fro. U. S. Department of Commerce, Weather Bureau, Weekly Weather and Crop Bulletin for weeks ending May 4 and May 11, 1943).

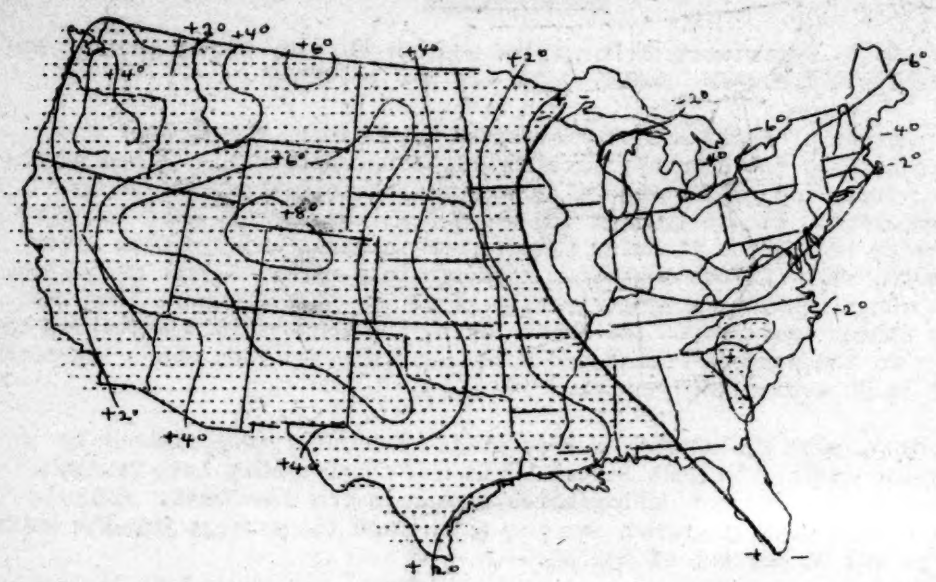
The weather of April was characterized by abnormal warmth over the western half of the country, unseasonably cool weather in a large northeastern area, and rather general subnormal precipitation, except in limited areas. Figure 1, page 210 shows that the monthly mean temperatures were from 3° to 7° below normal from Virginia and the Ohio River northward, while in the Southeast approximately normal warmth prevailed. On the other hand, they were markedly above normal everywhere from the Plains States westward to the Great Basin, the largest plus anomalies appearing in the western Plains and Rocky Mountain sections where the month was 6° to 8° warmer than normal.

Figure 2, page 210 shows the percentage of normal precipitation by States for April. In most States April had considerably less rainfall than March; the largest deficiencies appear in the Southwest. Only 12 States had as much as normal for the month, and the average for the entire country, was 80 percent of normal.

WEATHER FROM THE WINTER OF 1941-42 TO THE WINTER OF 1942-43

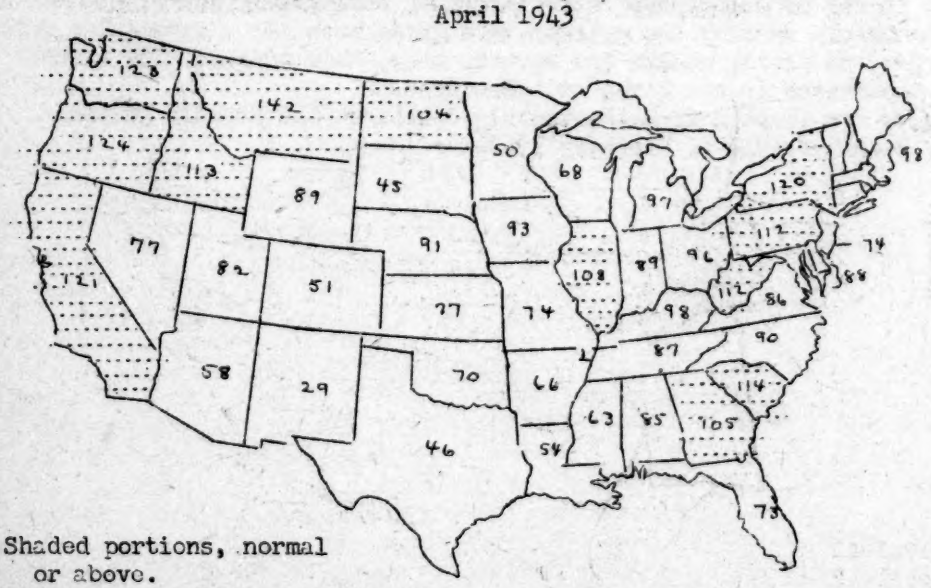
The accompanying maps (Figs. 1-15; pp. 211 to 218), which combine the monthly charts of departures from the normal temperature and precipitation, indicate merely whether the weather in a given area for a particular month was warmer and drier, cooler and wetter, etc., than normal. The extent of the departures is not given on these maps.

The maps are adapted from the monthly charts in the Monthly Weather Review, December 1941 to February 1943.



Shaded portions show excess (+).
Unshaded portions show deficiency (-).
Lines show amount of excess or deficiency.

Fig. 1. Departure of Mean Temperature from Normal, April 1943



Shaded portions, normal or above.
Unshaded portions, below normal.

Fig. 2. Percentage of Normal Precipitation by States, April 1943

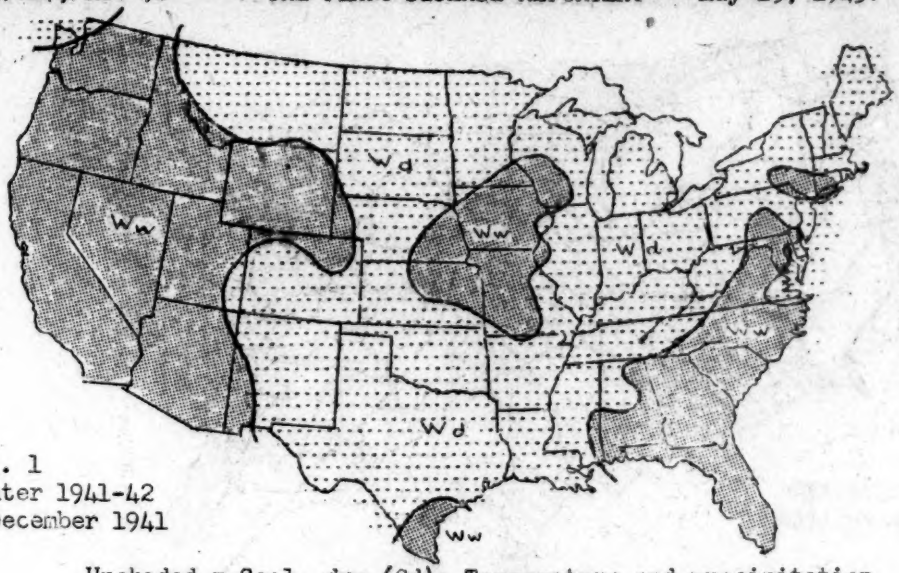


Fig. 1
Winter 1941-42
December 1941

Unshaded = Cool, dry (Cd): Temperature and precipitation both below normal

= Cool, wet (Cw): Temperature below, precipitation above normal

= Warm, dry (Wd): Temperature above, precipitation below normal

= Warm, wet (Ww): Temperature and precipitation both above normal

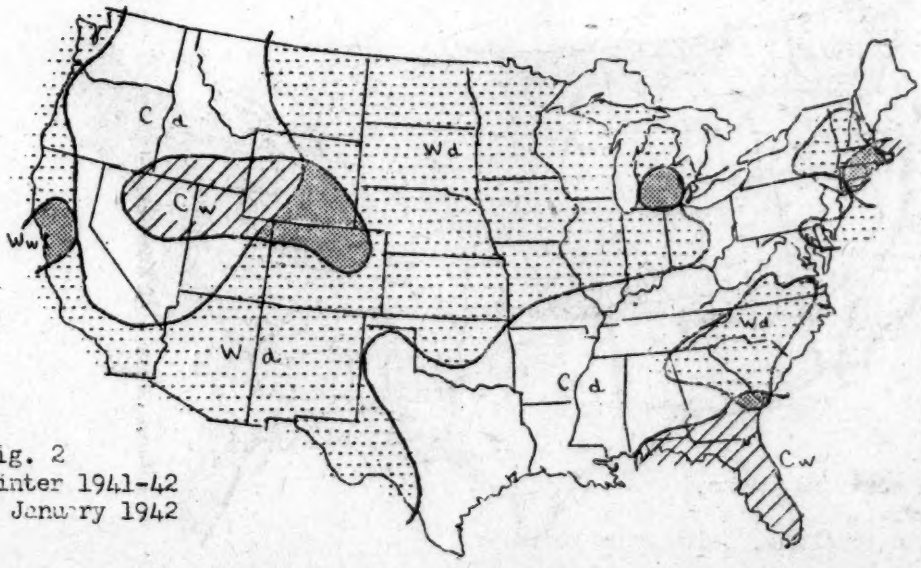


Fig. 2
Winter 1941-42
January 1942

Temperature and Precipitation Compared with Normal:
Figure 1 (upper) for December 1941; Figure 2 (lower) for January 1942

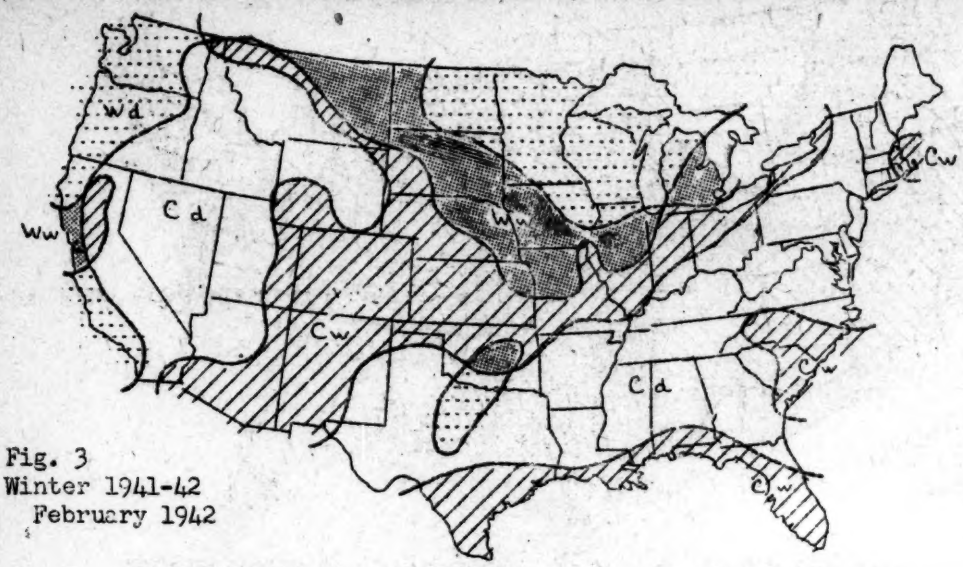


Fig. 3
Winter 1941-42
February 1942

Unshaded = Cool, dry (Cd): Temperature and precipitation both below normal

= Cool, wet (Cw): Temperature below, precipitation above normal

= Warm, dry (Wd): Temperature above, precipitation below normal

= Warm, wet (Ww): Temperature and precipitation both above normal

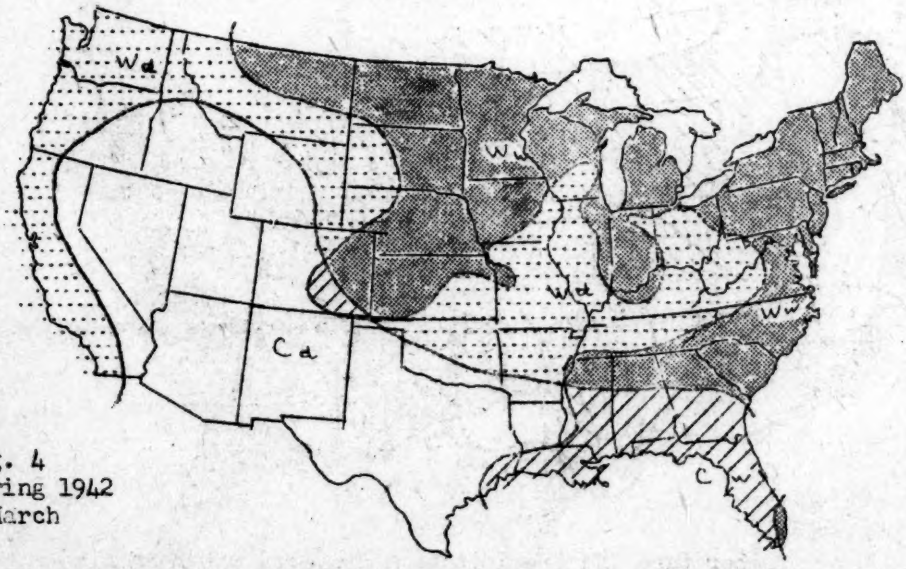


Fig. 4
Spring 1942
March

Temperature and Precipitation Compared with Normal:
Figure 3 (upper) for February 1942; Figure 4 (lower) for March 1942

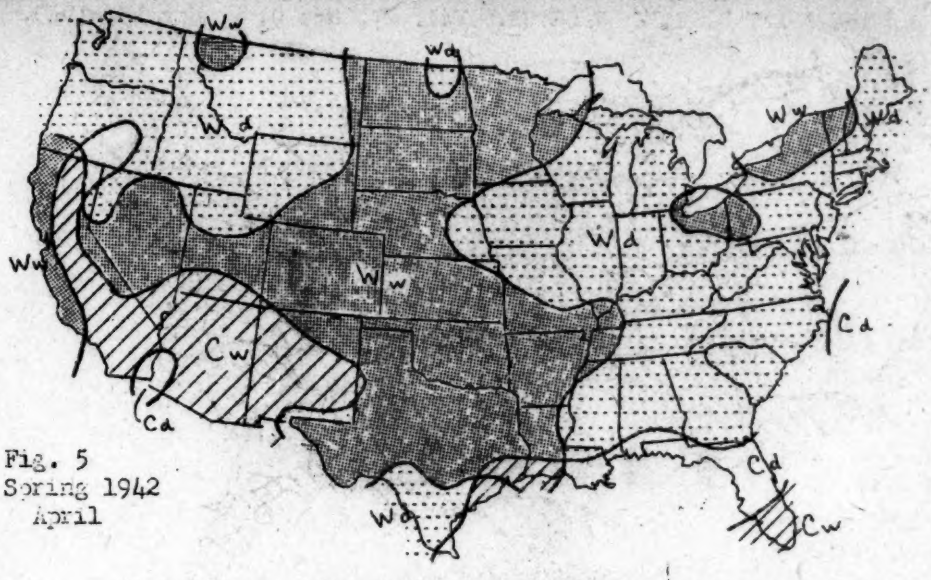


Fig. 5
Spring 1942
April

Unshaded = Cool, dry (Cd): Temperature and precipitation both below normal

= Cool, wet (Cw): Temperature below, precipitation above normal

= Warm, dry (Wd): Temperature above, precipitation below normal

= Warm, wet (Ww): Temperature and precipitation both above normal

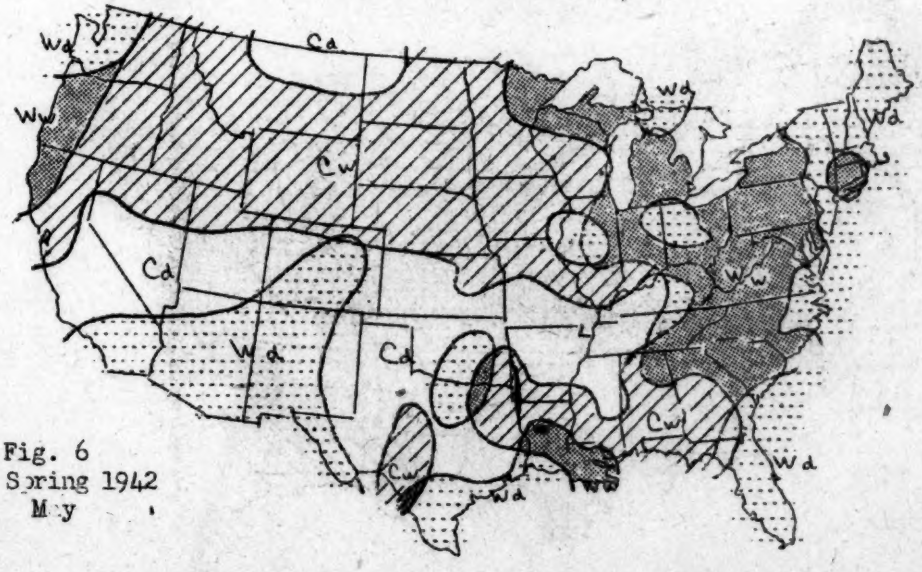


Fig. 6
Spring 1942
May

Temperature and Precipitation Compared with Normal:
Figure 5 (upper) for April 1942; Figure 6 (lower) for May 1942

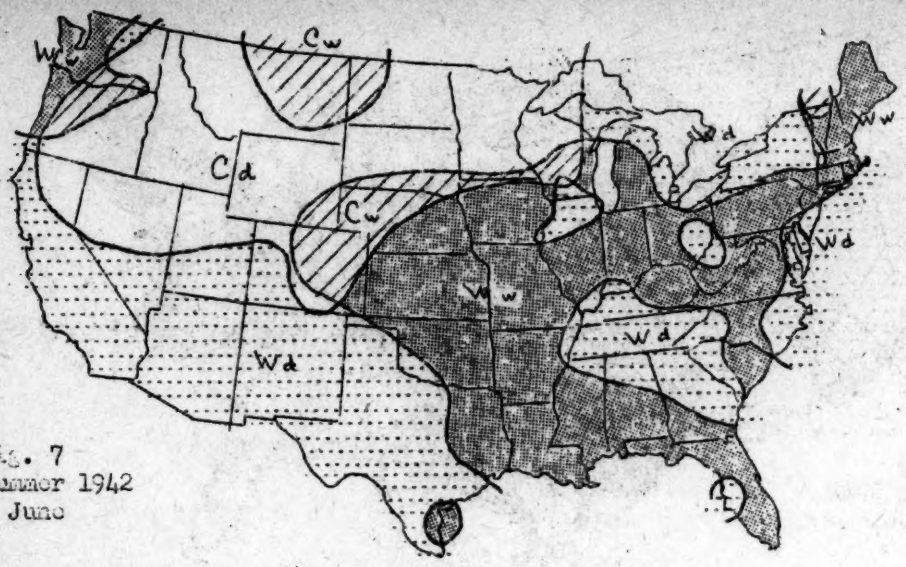


Fig. 7
Summer 1942
June

Unshaded = Cool, dry (Cd): Temperature and precipitation both below normal

= Cool, wet (Cw): Temperature below, precipitation above normal

= Warm, dry (Wd): Temperature above, precipitation below normal

= Warm, wet (Ww): Temperature and precipitation both above normal

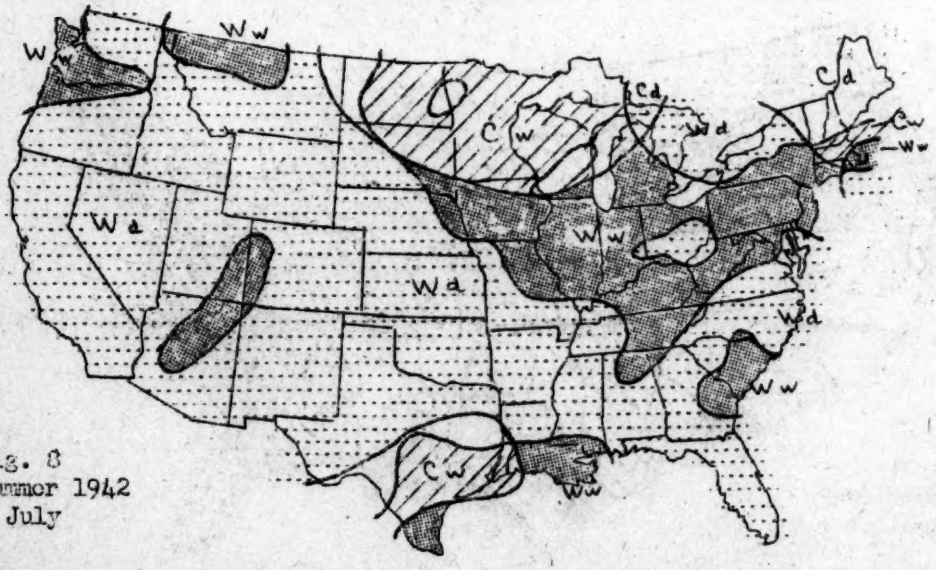


Fig. 8
Summer 1942
July

Temperature and Precipitation Compared with Normal:
Figure 7 (upper) for June 1942; Figure 8 (lower) for July 1942

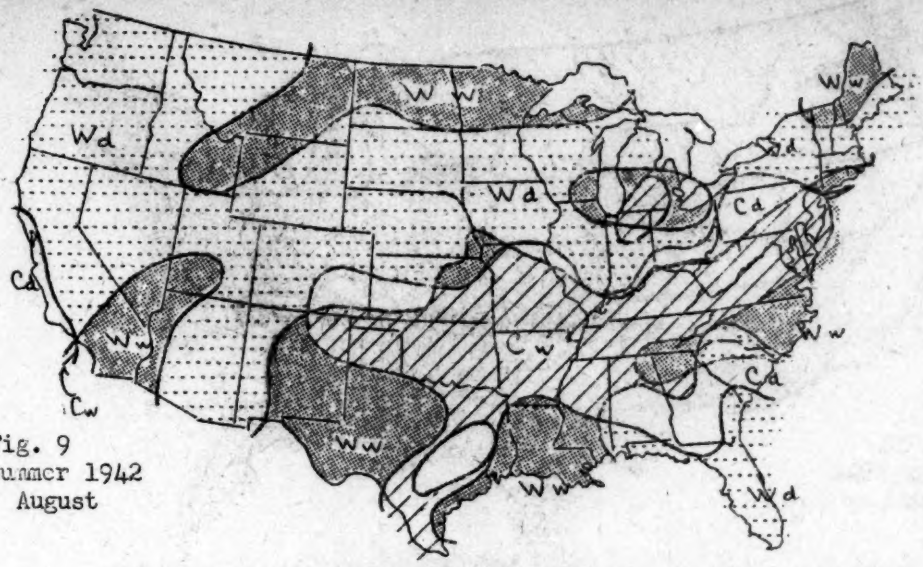


Fig. 9
Summer 1942
August

Unshaded = Cool, dry (Cd): Temperature and precipitation both below normal

= Cool, wet (Cw): Temperature below, precipitation above normal

= Warm, dry (Wd): Temperature above, precipitation below normal

= Warm, wet (Ww): Temperature and precipitation both above normal

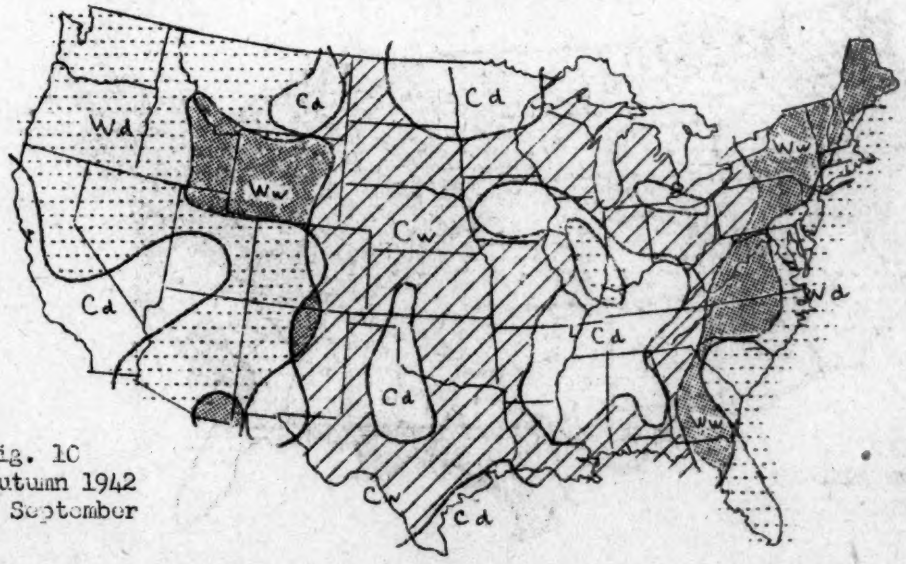


Fig. 10
Autumn 1942
September

Temperature and Precipitation Compared with Normal:
Figure 9 (upper) for August 1942; Figure 10 (lower) for September 1942

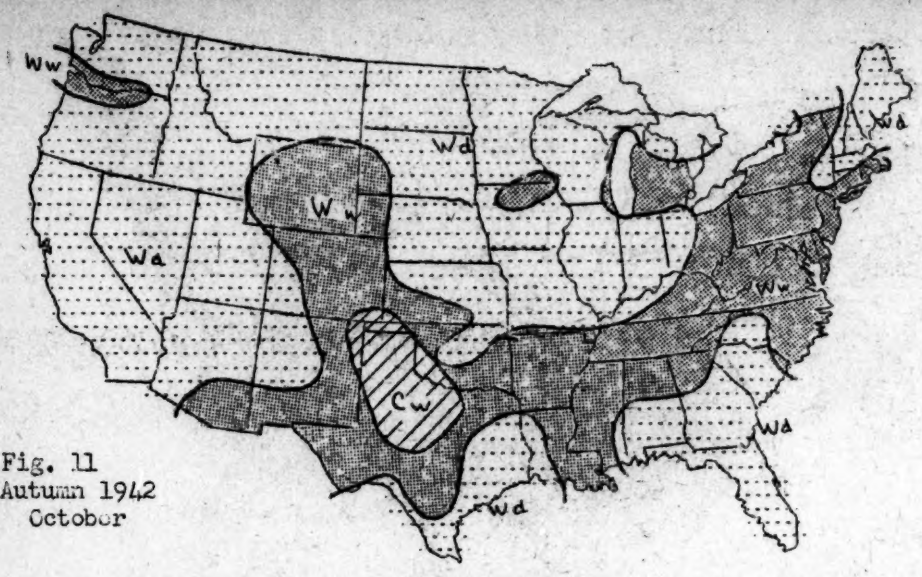


Fig. 11
Autumn 1942
October

Unshaded = Cool, dry (Cd): Temperature and precipitation both below normal

= Cool, wet (Cw): Temperature below, precipitation above normal

= Warm, dry (Wd): Temperature above, precipitation below normal

= Warm, wet (Ww): Temperature and precipitation both above normal

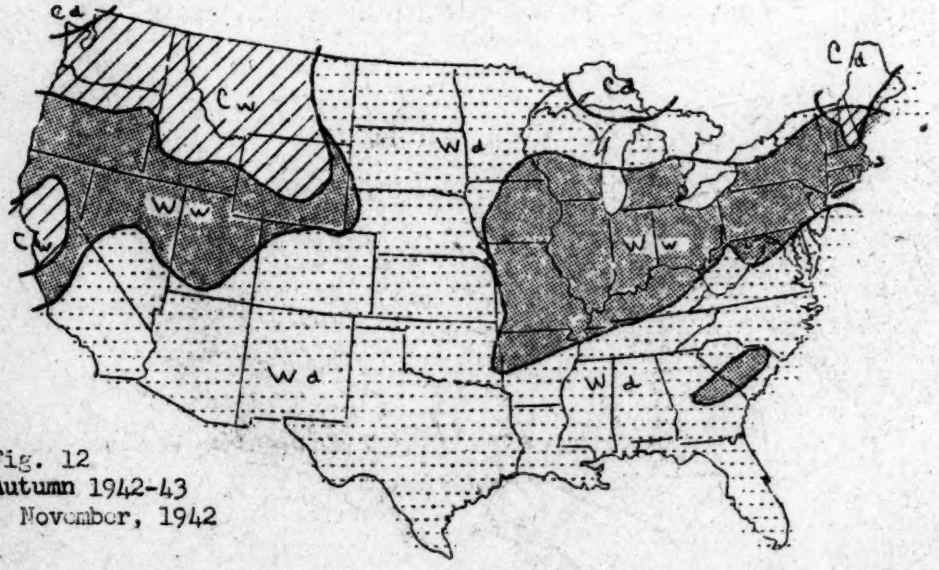


Fig. 12
Autumn 1942-43
November, 1942

Temperature and Precipitation Compared with Normal:
Figure 11 (upper) for October 1942; Figure 12 (lower) for November 1942

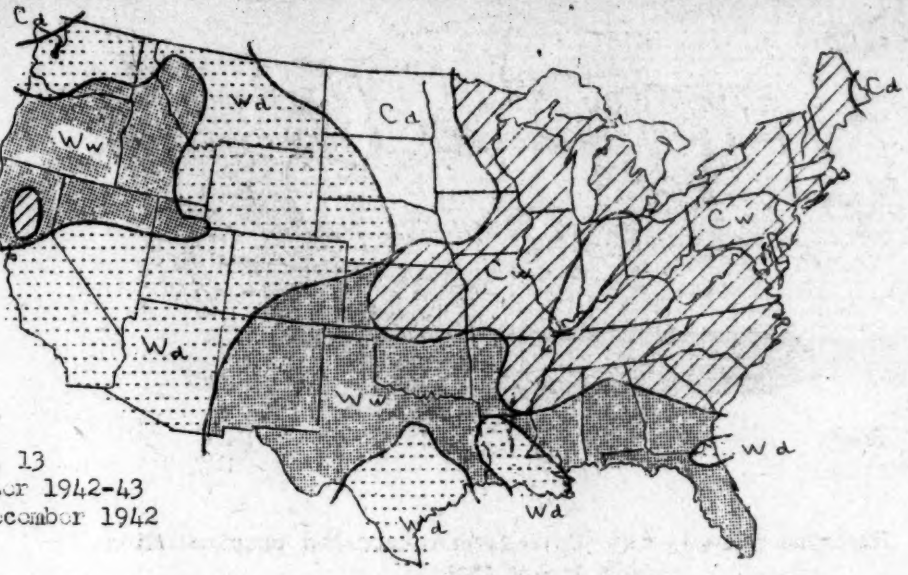


Fig. 13
Winter 1942-43
December 1942

Unshaded = Cool, dry (Cd): Temperature and precipitation both below normal

= Cool, wet (Cw): Temperature below, precipitation above normal

= Warm, dry (Wd): Temperature above, precipitation below normal

= Warm, wet (Ww): Temperature and precipitation both above normal

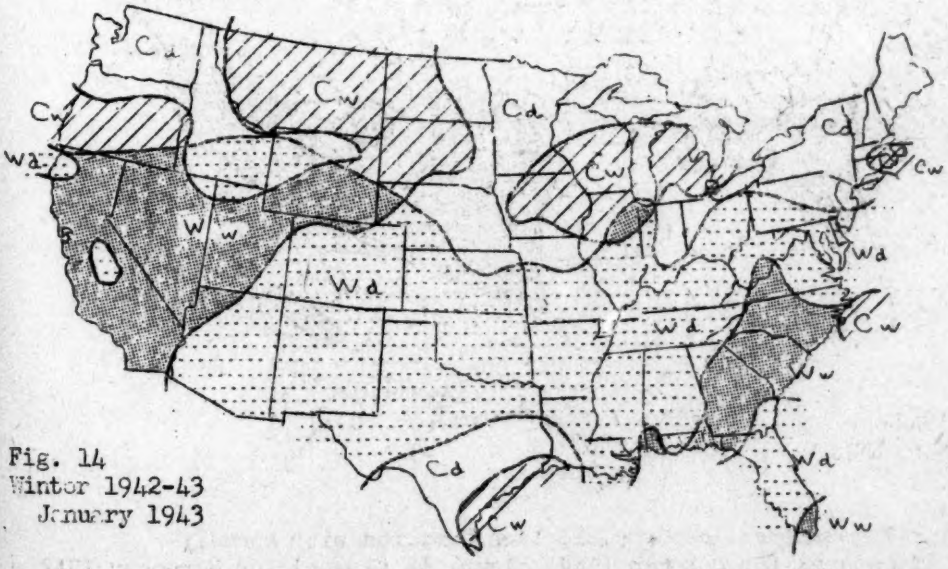


Fig. 14
Winter 1942-43
January 1943

Temperature and Precipitation Compared with Normal:
Figure 13 (upper) for December 1942; Figure 14 (lower) for January 1943

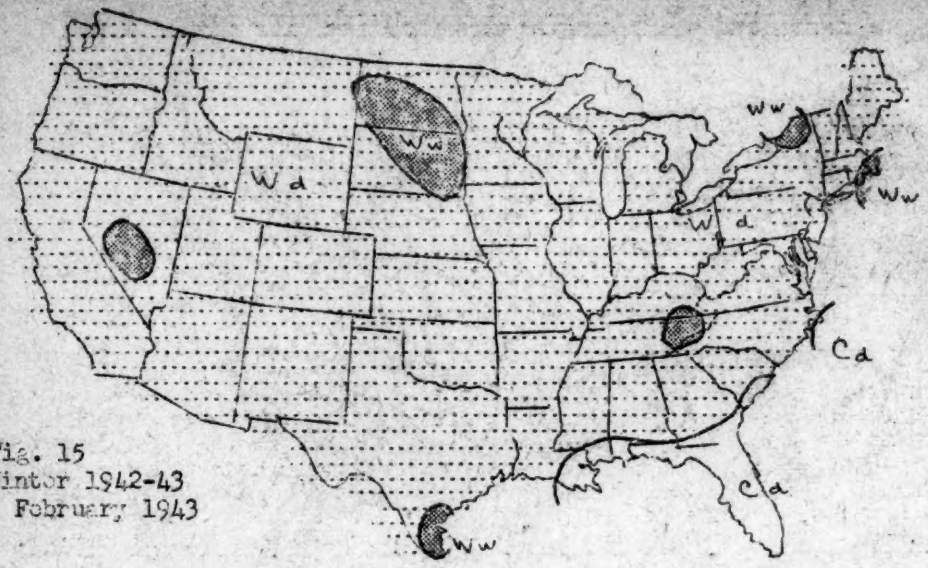


Fig. 15
Winter 1942-43
February 1943

Unshaded = Cool, dry (Cd): Temperature and precipitation both below normal

= Cool, wet (Cw): Temperature below, precipitation above normal

= Warm, dry (Wd): Temperature above, precipitation below normal

= Warm, wet (Ww): Temperature and precipitation both above normal

Temperature and Precipitation Compared with Normal:
Figure 15 for February 1943